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(54) Ammunition shell

(57) For sealing of a projectile 3 of an ammunition shell with respect to the weapon barrel, there is attached at the base of the projectile an annular sealing collar 6 whose material is softer than that of the projectile 3, the propellant gas acting deformingly on an inclined surface 64 of the sealing collar to urge its outer part 63 against the barrel. The projectile itself is not deformed on firing. The collar 6 is held by a ring 7 surrounding a rear plug of the projectile.

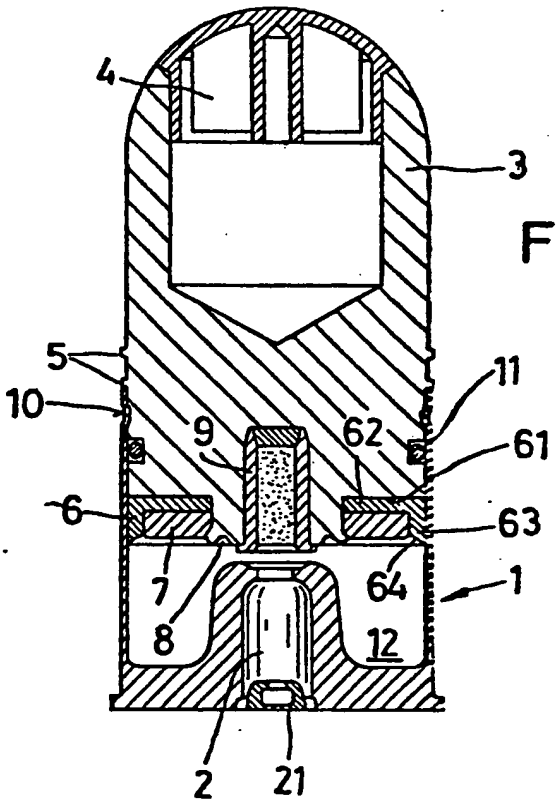

FIG.1

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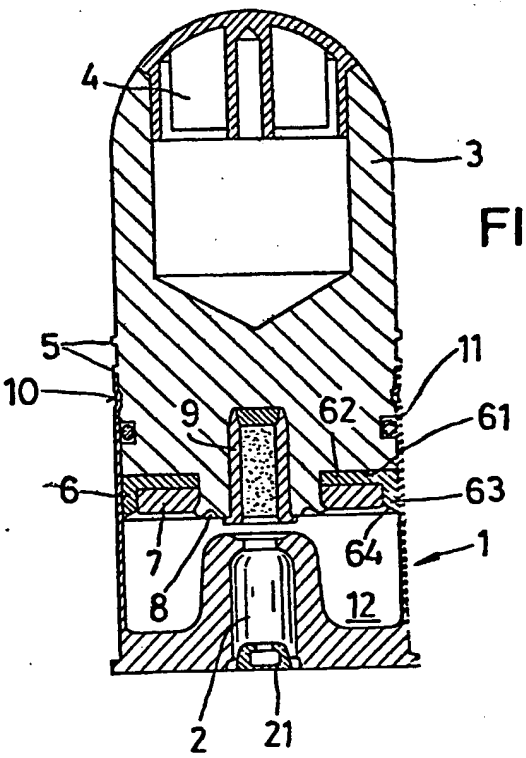

FIG.1

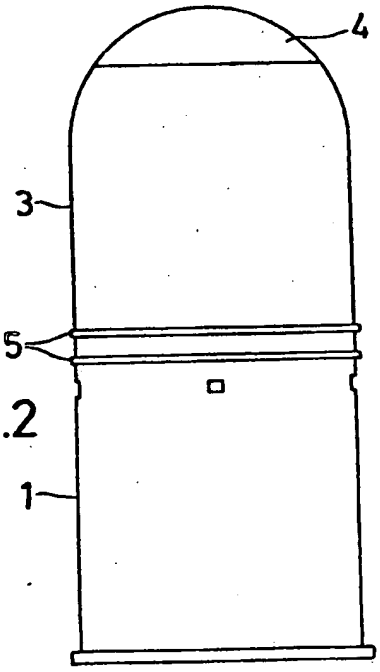

FIG.2

SPECIFICATION

Ammunition shell

This invention relates to an ammunition shell in particular for large calibre hand guns (pistols or revolvers), which shell comprises a cartridge case which contains a pressure cartridge with ignition capsule and propellent charge, and a projectile whose rearward section is surrounded by the cartridge case.

Shells are known for hand-firearms which consist of a cartridge case, an ignition capsule, a propellent charge and a projectile. The projectiles are generally deformable up to calibres of about 10 mm. They therefore consist of lead or lead alloys which may or may not provide the external surface of the projectile. The deformation is of great importance for the firing procedure because an enlarging of the diameter of the projectile only occurs under the compressive force of the powder gas pressure and makes it possible to attain a gas tight seal in the barrel as the projectile passes therethrough.

Larger calibres (above 10 mm) are in general chosen if some functional elements (e.g. explosive charges, igniters or pyrotechnic charges) must be housed in the projectile. The projectile must then be produced from rigid materials in order to protect the inner functional elements from the gas pressure forces. All the usual metals or reinforced plastics can be considered therefore for use in the manufacture of such shell cases. Guide rings which produce a gas tight seal between shell body and barrel wall by deformation will generally have to be employed with these shells. The deforming forces acting on the guide rings are however often so large that they are already of the order of magnitude of the operational forces and—in particular if they are non-uniform—they influence unsatisfactorily the smoothness of the firing procedure. This case occurs especially with ammunition with which low gas pressures are produced. A low gas pressure must however be produced even with large calibre pistol ammunition because otherwise the recoil force exceeds the value which a pistol firer is still able to support with the arm. The ignition of the propellant and its sufficient combustion cannot be guaranteed without special assistance at these gas pressures.

According to the present invention, there is provided an ammunition shell, which comprises a cartridge casing which contains a pressure cartridge containing an ignition capsule and propellent charge and a projectile whose rearmost part is surrounded by the cartridge casing, the projectile comprising an annular sealing collar which is expandable radially outwards over the peripheral contour of the projectile, positioned in the projectile body.

More particularly, the present invention provides for a sealing collar of rubber, plastics, fibre filled substances, moulded laminated plastics or elastic metal shaped parts to be so positioned in the base of the projectile that it is outwardly deformed over the projectile contour under the pressure which is produced by the propellent charge, and can join the wall of the barrel. The sealing collar consists of a material which is essentially more deformable than the material of the projectile. It is located within the cartridge case and is protectively located. The firing precision is not influenced by the deformation of the deformable sealing collar which is relatively soft and easily deformable in relation to the material of the projectile.

Preferably the sealing collar is of L-shape in cross-section and it possesses a radially-directed web as well as an axially-directed web extending rearwardly and fitting against the inner surface of the cartridge casing. The radially directed (or radial) web is merely for the fixing and restraining of the sealing collar on the projectile, whereas the axially directed (axial) web extending rearwardly lies against the weapon barrel and provides the sealing function. The axial web can be limited at the rearward end by an inclined surface inclined rearwardly and outwardly, by means of which the spreading effect is increased.

According to a preferred embodiment of the invention, the sealing collar is fitted in a recess of the projectile body extending up to the peripheral surface of the projectile by means of a ring secured to the projectile and it adjoins the forward side and the periphery of the ring. The ring and the sealing collar surround a rear plug at the base of the projectile.

For a better understanding of the invention and to show how the same can be carried into effect, reference will now be made, by way of example only, to the accompanying drawing, wherein:

Figure 1 is a longitudinal section through a shell embodying this invention and

Figure 2 is a side view of the shell.

The illustrated shell possesses a cylindrical cartridge casing 1 formed of a metal (aluminium, steel or brass) or of hard plastics material and having a cylindrical wall with a reinforced base part. The base part possesses an inwardly directed projection in which a propellent charge is located in a cartridge 2. On ignition of the propellent charge by an impact on an impact igniter 21, very high pressures occur in the cartridge 2 on account of the low free volume and act satisfactorily on the burning away of the propellant. The high pressure gas only escapes downwardly into annular chamber provided by the cartridge casing 1, and serve to drive the projectile out of the cartridge casing. A projectile 3 shown by way of example is a spin projectile which is designed for a pistol whose barrel contains ri-

fling or lands. The projectile 3 is drilled out at the forward end for displacement rearwardly of the centre of gravity. The bore thereby produced is closed off with a plug 4 possessing elasticity, being for example of synthetic plastics material such as polyethylene or polycarbonate or even an elastomer such as rubber. The plug 4 is coloured and characterises the type of ammunition by this colour marking.

The projectile 3 which is inserted with its rearward region into the open end of the cartridge casing 1, has guide rings 5 formed thereon beyond the cartridge casing. These guide rings surround the projectile body and have merely the function of imparting a spin to the projectile in combination with the riflings of the weapon barrel. The guide rings 5 do not however give rise to any gas tight seal with the weapon barrel.

A sealing collar 6 is fixed in an annular recess 61 at the base of the projectile. Recess 61 is open radially in an outward direction and axially in a rearward direction. The sealing collar 6 is of L-shaped form. It possesses a radial web 62 and, at its outer part, an axial web 63 directed rearwardly. The axial web 63 ends in an inclined surface 64 inclined outwardly and rearwardly. The sealing collar 6 is held by a ring 7 which surrounds a rear plug of the projectile 3 and is fixed to this by formations 8.

In the illustrated shell, a tracer charge is provided at the rear of the projectile 3 in the rear plug. Instead of the tracer charge or additionally thereto there can be incorporated other functional elements such as detonators, delay lines and the like.

The combination of the projectile 3 with the cartridge casing 1 is achieved by means of crimping points 10 which are distributed uniformly around the circumference. The crimping can however also be carried out in annular manner.

For ensuring sealing with respect to fluids, the projectile 3 is provided in front of the sealing collar 6 with an O-ring 11 let into an annular groove, which ring seals the projectile against the cartridge casing 1.

After ignition of the cartridge 2, the high pressure combustion gases escape into the chamber 12 between cartridge and projectile base. As a result of the pressure build-up in the chamber 12, the projectile 3 is accelerated so that it disengages from the cartridge casing. The gas pressure acting on the inclined surface 64 of the annularly shaped sealing collar 6 presses the radial web 63 outwardly against the weapon barrel. In this way, the gap between projectile and weapon barrel is sealed. As a consequence of the ductility of the sealing collar 6, the uniformity of the muzzle velocity and the precision of protection with respect to projectiles without such a sealing collar is essentially increased.

CLAIMS

1. Ammunition shell, which comprises a cartridge casing which contains a pressure cartridge containing an ignition capsule and a propellent charge and a projectile whose rearmost part is surrounded by the cartridge casing, the projectile comprising an annular sealing collar which is expandable radially outwards over the peripheral contour of the projectile, positioned in the projectile body.

2. Ammunition shell according to claim 1, wherein the sealing collar is of L-shaped cross-section, possessing a radially-directed web as well as a rearwardly extending web lying against the internal surface of the cartridge casing.

3. Ammunition shell according to claim 2, wherein the rearwardly extending web is bounded at the rearward end by an inclined surface inclined outwardly and rearwardly.

4. Ammunition shell according to any one of claims 1 to 3, wherein the sealing collar is secured in a recess of the projectile body which extends to the peripheral surface of the projectile by means of a ring fixed to the projectile, with the sealing collar abutting the forward side and the periphery of the ring.

5. Ammunition shell according to any one of claims 1 to 4, wherein the sealing collar is formed of rubber, plastics, fibre-filled substance, moulded laminated plastics or elastic metal.

6. Ammunition shell according to any one of claims 1 to 5, wherein the projectile is sealed off with respect to the cartridge casing by means of an O-ring.

7. Ammunition shell according to any one of claims 1 to 6, wherein the projectile is drilled out at its nose and the bore formed is closed off by a plug of plastics material.

8. Ammunition shell according to claim 7, wherein the plug is formed of synthetic plastics material or an elastomer.

9. Ammunition shell as claimed in claim 8, wherein the plug is formed of polyethylene, polycarbonate or rubber.

10. Ammunition shell according to one of claims 1 to 9, wherein the pressure cartridge is inserted at the base of the cartridge casing from the outside into a reinforcing part of the casing.

11. Ammunition shell according to any preceding claim, which is of a calibre for it to be used in a large calibre piston or revolver.

12. Ammunition shell, substantially as hereinbefore described with reference to, and as shown in, the accompanying drawing.

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